

Audit

Report



OFFICE OF THE INSPECTOR GENERAL

ELECTRONIC COMBAT INTEGRATED TEST FACILITIES

Report Number 93-006

October 16, 1992

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The following abbreviations and acronyms are used in this report.

ACETEF.. Air Combat Environment Test and Evaluation Facility
AFEWES.... Air Force Electronic Warfare Evaluation Simulator
AFB..... Air Force Base
BAF..... Benefield Anechoic Facility
DT&E..... Director, Test and Evaluation
ECITFs..... Electronic Combat Integrated Test Facilities
EC..... Electronic Combat
ECM..... Electronic Counter Measures
EW..... Electronic Warfare
HWIL..... Hardware-in-the-Loop
IDA..... Institute for Defense Analyses
JCG(T&E)..... Joint Commanders Group (Test and Evaluation)
LAC..... Large Anechoic Chamber
LRUs..... Line Replaceable Units
REDCAP.....Real-time Electromagnetic Digitally Controlled
Analyzer and Processor
RF..... Radio Frequency
SIL..... Systems Integration Laboratory
TEMPS..... Test and Evaluation Master Plans



INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
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ARLINGTON, VIRGINIA 22202

October 16, 1992

MEMORANDUM FOR DIRECTOR, TEST AND EVALUATION

SUBJECT: Audit Report on Electronic Combat Integrated Test
Facilities (Report No. 93-006)

We are providing this final report for your information and use. Your comments to the draft report, as well as the Navy and Air Force comments to you were considered in preparing the final report.

The recommendations are subject to resolution in accordance with DoD Directive 7650.3 in the event of nonconcurrence or failure to comment. You must provide final comments on the unresolved recommendations by December 15, 1992. See the "Status of Recommendations" section at the end of the findings for recommendations you must comment on and the specific requirements for your comments. We also ask that your comments indicate concurrence or nonconcurrence with the material internal control weakness highlighted in Part I.

The courtesies extended to the audit staff are appreciated. If you have any questions on this audit, please contact Mr. Raymond Spencer at (703) 614-3995 (DSN 224-3995) or Mr. Steven Hughes at (703) 693-0362 (DSN 223-0362). The planned distribution of this report is listed in Appendix K.

A handwritten signature in cursive script, reading "E. Jones", is positioned above the typed name.

Edward R. Jones
Deputy Assistant Inspector General
for Auditing

Enclosure

cc:
Secretary of the Navy
Secretary of the Air Force

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This report was prepared by the Acquisition Management Directorate, Office of the Assistant Inspector General for Auditing, DoD. Copies of the report can be obtained from the Information Officer, Audit Planning and Technical Support Directorate, at 703-614-6303 (DSN 224-6303).

OFFICE OF THE INSPECTOR GENERAL

AUDIT REPORT NO. 93-006
(Project No. 2AB-0025)

October 16, 1992

ELECTRONIC COMBAT INTEGRATED TEST FACILITIES

EXECUTIVE SUMMARY

Introduction. Electronic combat integrated test facilities (ECITFs), through a combination of simulated and actual hardware-in-the-loop, provide capabilities for testing and evaluating weapons systems hardware and software in a controlled ground test environment. These facilities consist of anechoic chambers connected to various simulation and instrumentation laboratories. These simulations stimulate the actual weapon system into performing as it would in a real-world environment. A complete Category I facility represents a significant investment in test facilities and equipment, estimated to cost \$400 million.

ECITFs and their associated simulation laboratories are classified in one of four categories. Category I facilities provide full combat environment simulation capabilities and allow factors such as tactics, strategy, and multi-platform effects to be evaluated. These facilities enable testing to be conducted in full many-on-many electronic combat environment simulations, including enemy, friendly, and neutral forces. Category I facilities can accomplish all required test functions.

Objectives. Initially, our objectives were to review the justifications for developing multiple ECITFs and to evaluate the applicable internal controls. Our objectives were expanded, at the request of members of the Maryland congressional Delegation, to evaluate the methodology and evidence used to support the Institute for Defense Analyses (IDA) cost comparison report that identifies alternatives for developing Navy and air Force ECITFs.

Audit Results. The audit determined that IDA Paper P-2727 contained critical flaws that significantly impacted the report's conclusions. As a result, the report does not provide the Director, Test and Evaluation (the Director), a sound basis for making investment decisions (Finding A).

In addition, we determined that the Navy and Air Force investment plans for upgrading ECITFs could be more economically accomplished through relocation of assets. As a result, the DoD could save approximately \$91 million, while providing better control and more efficient use of test assets (Finding B).

Internal Controls. The audit identified no material internal weakness related to the development and instrumentation of ECITFs.

Potential Benefits of Audit. The DoD can accomplish significant upgrade to their integrated test facilities by reassigning assets as opposed to additional procurement. The potential monetary benefits gained by implementing the recommendations B.1 and B.2 will be approximately \$91 million (Finding B). Appendix H summarizes the potential benefits resulting from the audit.

Summary of Recommendations. We recommended that the Director not support development of the Benefield Anechoic Facility (BAF) based upon the IDA cost analysis report; limit further investment at BAF to the currently approved reprogramming authority until opportunities for redistribution of existing assets are fully explored; direct the EW Reliance Group to accelerate their study on transferring Real-time Electromagnetic Digitally Controlled Analyzer Processor and Air Force Electronic Warfare Evaluation Simulator facilities' assets; and exercise oversight to restrict new Air Force investments in Real-time Electromagnetic Digitally Controlled Analyzer Processor and Air Force Electronic Warfare Evaluation Simulator facilities.

Management Comments. The Director nonconcurrent with the draft report recommendations pertaining to funding for the BAF and proposed an alternative recommendation. This included limiting further investment in the BAF to current Air Force reprogramming capabilities, contingent upon the Air Force's agreeing to prohibit program specific funding at BAF, until opportunities for redistribution of existing assets, as discussed in Finding B, are fully explored.

The Director concurred in principle with the draft report recommendations to transfer selected integrated air defense simulators at the Real-time Electromagnetic Digitally Controlled Analyzer Processor facility to the ACETEF and to transfer test instrumentation at the Air Force Electronic Warfare Evaluation Simulator (AFEWES) facility to develop the BAF. He proposed alternative wording; the revised recommendations related to Findings A and B are substantially as proposed by the Director. Comments from the Director are discussed in Findings A and B, and the full text is included in Part IV. We request comments from the Director on all recommendations and estimated potential monetary benefits.

PART I - INTRODUCTION

Background

Electronic combat integrated test facilities (ECITFs), through a combination of simulated and actual hardware-in-the-loop (HWIL), provide capabilities for testing and evaluating weapon systems hardware and software in a controlled ground test environment. These facilities consist of anechoic chambers connected to various simulation and instrumentation laboratories. These simulations stimulate the actual weapon system into performing as it would in a real-world environment. A complete Category I facility represents a significant investment in test facilities and equipment, estimated to cost \$400 million.

ECITFs and their associated simulation laboratories are classified in one of four categories. Category I facilities provide full combat environment simulation capabilities and allow factors such as tactics, strategy, and multi-platform effects to be evaluated. These facilities enable testing to be conducted in full many-on-many electronic combat environment simulations, including enemy, friendly, and neutral forces. Category I facilities can accomplish all required test functions. The following chart illustrates capabilities of Category I, II, III, and IV facilities, as defined by the Director, Test and Evaluation.

Table 1. CATEGORIES OF ECITFs

<u>Capability</u>	<u>Category</u> ¹			
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
Man-in-the-loop	Yes	Yes	No	No
Many-on-many	Yes	No	No	No
Spectrum Coverage	Yes	Limited	Limited	Limited
Red/Blue/Neutrals	Yes	Limited	Limited	Limited
Closed loop	Yes	Limited	No	No
Open loop	Yes	Yes	Yes	Yes
C3 simulation	Yes	Limited	Limited	Limited
Theater force level	Yes	No	No	No
Many-on-one	Yes	Yes	No	No
Full-scale vehicle	Yes	Yes	Yes	No

At present, a Category I facility does not exist. Air Combat Environment Test and Evaluation Facility (ACETEF), located at Naval Air Warfare Center, Aircraft Division, is the most advanced ECITF within DoD and is designated as a Category II++² facility.

¹ "DDDR&E (T&E) Study of Anechoic Chambers Used to Support the T&E of Full Scale Systems," October 3, 1988, pages 3 and 4.

² Ibid, page 18.

Objectives

Initially, our objectives were to review the justifications for developing multiple ECITFs and to evaluate the applicable internal controls. Our objectives were expanded, at the request of members of the Maryland Congressional Delegation, to evaluate the methodology and evidence used to support the IDA cost comparison report that identified alternatives for developing Navy and Air Force ECITFs.

Scope

We interviewed Government and contractor personnel involved in ECITF management, acquisition, operation, testing and support. We also interviewed program managers identified to use the ECITFs. We reviewed current workload requirements as stated in program Test and Evaluation Master Plans for ECITFs and projected workloads through Fiscal Year 1997 that support upgrades to existing facilities. In addition, we reviewed historical workloads for these facilities from October 1988 to July 1992. We also reviewed funding data for the proposed upgrades.

This economy and efficiency audit was performed from February to August 1992 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly included such tests of internal controls as were considered necessary. Our Congressional tasking was dated August 4, 1992. Appendix J lists the activities visited or contacted during the audit.

Internal Controls

The audit identified no material internal control weakness related to the development and instrumentation of ECITF'S.

Prior Audits and Other Reviews

Three prior reports have been issued on upgrading and developing ECITFs. A summary of the reports issued is in Appendix A.

PART II - FINDINGS AND RECOMMENDATIONS

A. INSTITUTE FOR DEFENSE ANALYSES COST ANALYSIS

The Institute for Defense Analyses (IDA) Paper P-2727 "Cost Comparison of the Navy's Air Combat Environment Test and Evaluation Facility (ACETEF) and the Air Force's Electronic Combat Integrated Test (ECIT)" contained critical flaws that significantly impacted the report's conclusions. This was due to the absence of validating projected workload data at both locations and an improper assumption regarding the shift capacity of ACETEF. As a result, we believe the report does not provide the Director, Test and Evaluation (the Director), a sound basis for making investment decisions.

DISCUSSION OF DETAILS

Background

In November 1991, Congress directed OSD to review the costs and capabilities associated with the use of the Navy's ACETEF to satisfy aircraft electronic combat ground testing requirements instead of developing the Air Force Electronic Combat Integrated Test facility at Edwards Air Force Base (AFB), California, referred to as the Benefield Anechoic Facility (BAF). In response to the Congressional request, the Director contracted with IDA to assess the costs associated with ACETEF and BAF and the capabilities they represent with respect to Navy and Air Force requirements. The cost analysis examined investment costs for facilities, equipment, and software; deployment costs for testing at other than the primary flight test location; and operating costs for running the facilities over a 20-year period. IDA developed four alternatives to satisfy the Navy and Air Force's requirements. Of the four alternatives, IDA recommended developing BAF as the least costly alternative. IDA issued its conclusions to OSD in a report titled "Cost Comparison of the Navy's Air Combat Environment Test and Evaluation Facility and the Air Force's Electronic Combat Integrated Test," dated June 1992. The report was provided to Congress on June 25, 1992.

Certain members of Congress were concerned that the report contained inaccurate data and flawed conclusions. Accordingly, those members asked the Inspector General on August 4, 1992, (Appendix B) to review the data, analyses, and conclusions of the cost analysis in conjunction with our audit of "Electronic Combat Integrated Test Facilities" (Project No. 2AB-0025) which evaluated the justification for developing multiple electronic combat integrated test facilities. We evaluated IDA's methodology and evidence supporting the numbers and conclusions presented in its cost analysis report.

Our review disclosed that the cost analysis report contained two critical flaws and several minor discrepancies that adversely impacted its conclusions. The net effect was that IDA erred in accepting workloads as projected by the Services which resulted in overstating the total shifts needed to meet requirements; calculating the capacity obtainable for the alternatives identified; improperly disregarding prior investments in ECITFs; and incorrectly defining projected investment costs. This resulted in an incorrect comparison of costs versus needs met. See Appendix C for a complete listing of the deficiencies.

Computing the Shifts Needed to Meet Requirements. IDA computed that a total of 6.9 shifts would be required to handle the Navy and Air Force's projected ECITF workload, as shown in Table 2 below and on page vii of its report.

	Small	Large	
<u>User</u>	<u>Anechoic Chamber</u>	<u>Anechoic Chamber</u>	<u>Total</u>
Navy	2.0	1.8	3.8
Air Force	1.4	1.7	3.1
Total	3.4	3.5	6.9

4

shifts required would drop from 6.9 to 2.5. Therefore, IDA's chart on page vii should have shown as Table 3:

**Table 3. Future Requirements for ECITF Chambers
(Average Shifts Per Day)**

<u>User</u>	<u>Small Anechoic Chamber</u>	<u>Large Anechoic Chamber</u>	<u>Total</u>
Navy	.7	.7	1.4
Air Force	.5	.6	1.1
Total	<u>1.2</u>	<u>1.3</u>	<u>2.5</u>

The significance of IDA showing ECITF workload projections at 6.9, as opposed to 2.5, is that it draws the conclusion that no one facility could handle all ECITF workload projections.

Calculating the Capacity Obtainable for the Alternatives Identified. IDA developed four alternatives for satisfying Navy and Air Force ECITF capacity requirements as follows:

- o Alternative 1: Operate ACETEF at 2.5 shifts per day instead of the current 1.5. This alternative would not provide for a large anechoic chamber.

- o Alternative 2: Build a large anechoic chamber at ACETEF and operate two shifts in each chamber.

- o Alternative 3: Develop the BAF and operate both BAF and ACETEF at 2.5 shifts per day.

- o Alternative 4: Build a large anechoic chamber at ACETEF and develop BAF. The ACETEF would operate at two shifts in each chamber per day and BAF would operate at 2.5 shifts per day.

IDA eliminated Alternatives 1 and 4 from further consideration as being ineffective and too costly, respectively. Therefore, Alternatives 2 and 3 were the primary considerations for review. Figure 1 shows IDA's estimate of the capacity obtainable by Alternatives 2 and 3, as reflected on page viii of its report. We modified IDA's estimate for alternative 2 to reflect the addition of a fifth shift at ACETEF. The result is shown with the dotted line on Figure 1.

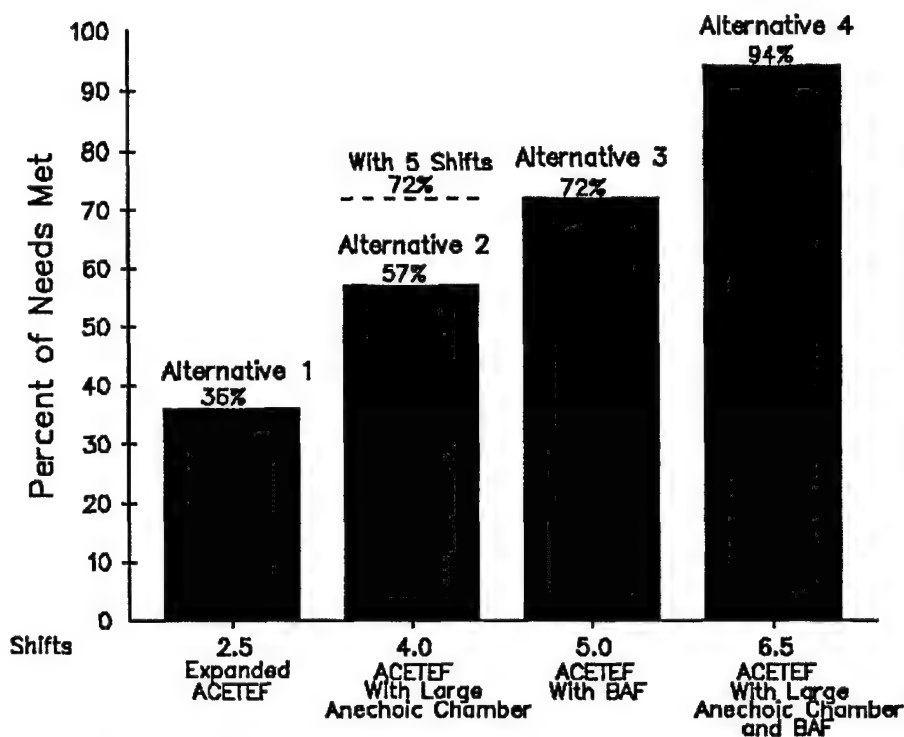


Figure 1 Requirements Satisfied by the Alternatives

The chart shows that Alternative 3 provides 15 percent more capacity than Alternative 2 (72 percent versus 57 percent). However, the key difference between the two alternatives was in the number of shifts assigned each alternative. Alternative 2 was limited to four shifts but Alternative 3 was allowed five shifts. We validated that one shift equates to 15 percent additional capacity. Thus, adding a shift to Alternative 2 would generate the same capacity as reflected in Alternative 3. Consequently, there would have been no difference in capacity obtainable between building a large anechoic chamber at ACETEF or in developing BAF. IDA could not provide us documentary support for its rationale in limiting Alternative 2 to four shifts per day. IDA's approach had a profound impact on all subsequent analysis and conclusions, in that it distorted the portrayal of the comparative capacities of ACETEF and BAF.

Prior Investments in ECITFs. IDA's cost analysis disregarded the Navy's \$249.5 million investment in ACETEF laboratories and the Air Force's \$60.2 million investment in the BAF large chamber. IDA classified these investments, on page 8 of its report, as sunk costs and excluded them from the analysis. We believe this is inappropriate because future investments would build on previously acquired capabilities to enhance an individual laboratory's capacity or to achieve complete testing through diversification.

Defining Projected Investment Costs. IDA's projected investments for ACETEF and BAF do not reflect an accurate comparison between the two alternatives. First, IDA included the Navy and OSD's planned \$60.5 million investment at ACETEF in both the Navy and Air Force figures of \$128.5 million and \$228.9 million, respectively. The \$60.5 million represents upgrading ACETEF to a Category I facility which exceeds that proposed for BAF. Second, IDA's proposed \$168.4 million investment in BAF only provides BAF with the existing capabilities at ACETEF (Appendix E). For a true comparison between two alternatives with like capabilities, it would have to be assumed that a large chamber costing \$68 million would be required for ACETEF. Therefore, the accurate projected investments, for comparison of like capabilities, would be \$68 million for the Navy and \$168.4 million for the Air Force. The planned BAF investments equating to ACETEF's capabilities are shown in Appendix F.

Comparing the Cost Versus Needs Met. As previously discussed, our review disclosed that the capacity for Alternative 2 was understated by one shift. Therefore, IDA's computation of costs versus needs met was also flawed. As shown in Figure 2, IDA computed the cost versus needs met to be:

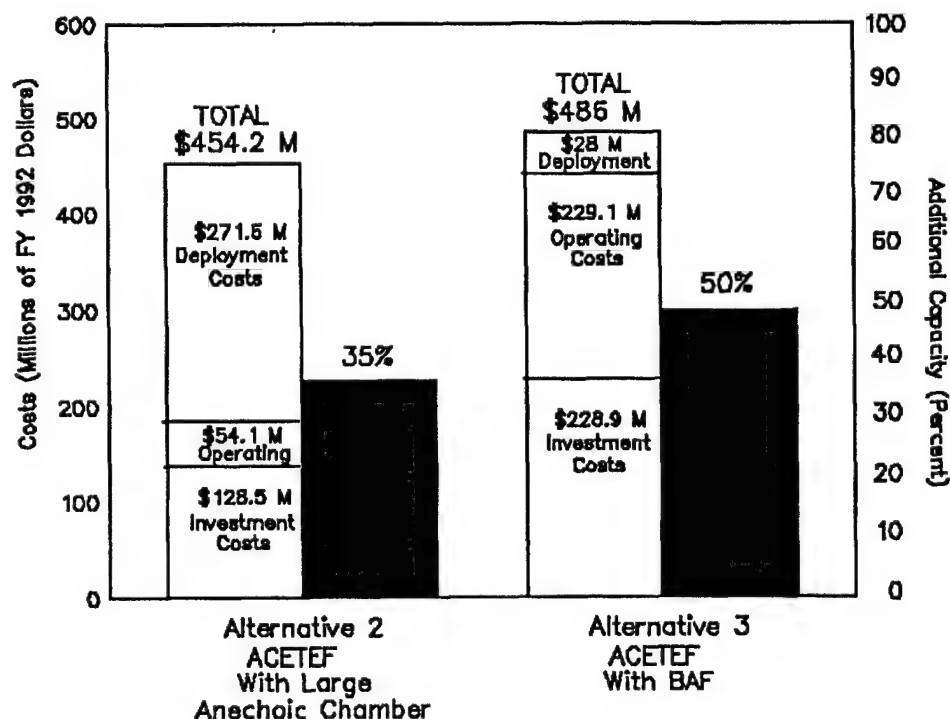


Figure 2 Costs Versus Needs Met - IDA Report

However, equalizing the capacities between the two alternatives would have shown that Alternative 2 would offer the lower cost per unit of capacity achieved (\$454 million and 50 percent versus \$486 million and 50 percent).

It should be noted that IDA included, within the \$454 million cost for Alternative 2, \$272 million to deploy Air Force aircraft to ACETEF. However, only \$28 million was included in Alternative 3 for Navy deployment to BAF. We concluded that the cost to deploy should not have been included in the analysis for several reasons. First, deployment costs for personnel and aircraft are not major cost factors even though costs exceed \$2 million. Second, estimates of Air Force deployment costs to ACETEF were for equipment to support an F-22 Systems Integration Laboratory (SIL) valued at \$27 million, Line Replaceable Units (LRUs) valued at \$89 million, contractor operations at the SIL estimated at \$115 million, and added flight tests estimated to cost \$127 million. IDA reduced these costs approximately 60 percent. Further, IDA did not factor similar costs for the Navy to deploy its aircraft to Edwards AFB, although IDA acknowledged that deployment for large aircraft requires more people and support. We believe the deployment costs of the Services would more or less offset each other.

To adjust for the errors that we perceived in the IDA Report, we removed deployment costs from both alternatives and decreased Navy and Air Force's investment costs by \$60.5 million (see page 7, Defining Projected Investment Costs). We also increased the operating cost for Alternative 2 by \$21.6 million to \$75.7 million to fund the additional shift. These changes show a significant disparity between the cost to capacity achieved for the alternatives, as shown in Figure 3.

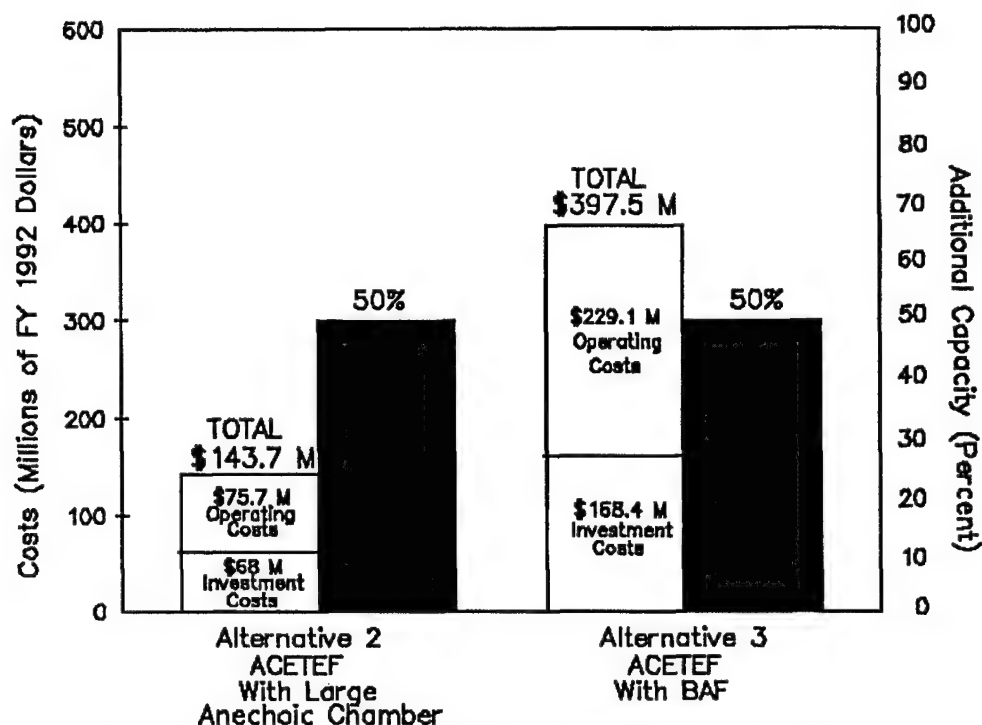


Figure 3 Costs Versus Needs Met - Audit Determination

As indicated in the above chart, Alternative 2 offers the same capacity for less than half the cost of Alternative 3 (\$143.7 million versus \$397.5 million).

Affordability of Systems Integration Laboratories. Both the Navy and Air Force agree that the ideal test method would involve collocating the SIL at the ECITF. The Air Force stresses that their collocation philosophy is even more important when testing future systems, such as the F-22 with its integrated avionics. The Director supports the Air Force methodology as necessary for testing future systems. The Navy has shown that, while desirable, collocation was not mandatory for past systems. The ideal situation does not necessarily represent the most economical application of DoD funds.

The Navy has acknowledged that the cost of supporting two SILs, one at the test range and one required by the contractor, was prohibitive for most programs. Maintaining a SIL at the test range requires an additional set of LRUs. LRUs are specific aircraft components, such as radars and jammers, and represent the major cost in equipping SILs. The LRUs for the B-2 were estimated to cost \$50 million; for the F-22, they were estimated to cost \$89 million. Further, the Air Force claims that although the SILs do not correct the anomalies, they provide a more efficient and cost-effective means of identifying anomalies and

collecting data to support weapon system performance measurement and anomaly definition.

Conflicting BAF Cost Estimates.

We requested Edwards AFB to provide projected costs for BAF in March 1992 and again in June 1992. The Air Force stated on both occasions that funding had been withdrawn before estimates for the individual building blocks were developed. However, the Air Force verbally informed us that the total cost to upgrade BAF to a category 1 facility would be approximately \$498 million. In August 1992, IDA informed us that the Air Force had not provided them cost estimates and thus IDA developed an estimate of \$168 million based on ACETEF capabilities. In August 1992, the Air Force provided us an estimate of \$179 million to instrument the BAF. A review of a previous Air Force briefing identified a 1990 chart showing the cost to instrument BAF under the building block approach to be \$398 million. BAF's cost estimates are shown in Table 4 and in more detail in Appendix G.

Table 4 Estimates to Instrument BAF

<u>Source</u>	<u>Date</u>	<u>Estimate</u>
Edwards AFB	1990	\$398 million*
Edwards AFB	June 1992	\$498 million*
IDA	June 1992	\$168 million**
Edwards AFB	August 1992	\$179 million**

* Represents cost to upgrade BAF to Category I.

** Represents current cost to instrument BAF to Category II

The difficulty in developing a cost estimate for BAF is that the Air Force has not identified the specific equipment required for each of the building blocks. It was not clear if the Air Force's current estimate of \$179 million to instrument BAF was all inclusive or if significant additional funding would be provided directly by programs such as the F-22.

Conclusion

It is our opinion that IDA's reliance on the integrity of the projected workload data, omission of a fifth shift at ACETEF, and disregard of prior investments in ECITFs was inappropriate. Substituting revised data into IDA's analysis shows that building a large chamber at ACETEF would be the most cost-effective, lowest risk alternative based on cost alone. However, the cost versus benefit of having collocated SILs and ECITFs is an issue that is not entirely quantifiable in dollars.

Since issuance of the draft report, we met with the Director on proposed changes to the recommendations. The Director proposed limiting the investment in BAF to the Air Forces's reprogramming capability. Reprogramming action refers to the transfer of funds

appropriated for a certain purpose to another use within a particular appropriation. The Air Force reprogramming capability is limited to \$4 million.

RECOMMENDATIONS, MANAGEMENT COMMENTS, AND AUDIT RESPONSE

We recommend that the Director, Test and Evaluation:

1. not support development of the Benefield Anechoic Facility based upon the Institute for Defense Analyses' cost analysis report, and

2. limit further investment at the Benefield Anechoic Facility to \$4 million, the Air Force's current reprogramming capability, contingent upon the Air Force's agreeing to prohibit program specific funding at the Benefield Anechoic Facility, until the opportunities for redistribution of existing assets, as discussed in Finding B, are fully explored.

Management Comment. The Director nonconcurred with the draft report Recommendations A.1. and A.2. and identified four areas of concern as discussed below:

- o Test capabilities. The Director stated that our audit was based on assumptions relating to current or past generation avionics technology systems, in particular electronic combat subsystems. He further stated that today's test capabilities are inadequate to test future avionics systems efficiently.

- o Workload validation. The Director stated that the Test and Evaluation Master Plans and program manager budget documentation were not dependable sources for long-term test resource planning or requirements validation; that each Service has revalidated sufficient workload to justify Integrated System Test Facilities at each of the (two) principal Service aircraft development sites, particularly in view of next-generation integrated systems; that each Service has been working (since 1988) through the Joint Commanders Group (Test and Evaluation) [JCG(T&E)] to conduct joint reviews; and that he was confident that (the Services') workload estimates were more representative than (the IG's).

- o Reliance effort. The Director stated that he has installed a Reliance approach to test resource planning. He further stated that this process, even in its early stages, has borne out the need for the two primary facilities that are the focus of our audit.

- o Facility shifts. The Director stated that he was not aware of any analysis that would support five shifts at the ACETEF or its associated chamber. That, to the contrary, the Navy maintains that even four shifts would require the right combination of customer needs and optimal scheduling of both

people and equipment. He further stated that the number of shifts available at ACETEF is not simply a matter of summing potential shift work at two separate locations: BAF and ACETEF.

Audit Response. We disagree with the Director's comments as discussed below.

o Test capabilities. Our audit reviewed the justifications for developing multiple comprehensive electronic combat integrated test facilities. In addition to past and current systems, we reviewed the future systems supporting the proposed upgrades to the BAF and ACETEF. In addressing future requirements the Air Force proposed working with the Navy to establish a correlation between BAF functions and ACETEF capabilities existing or under development at ACETEF. The results of the Air Force/Navy effort are presented in Appendix E. The conclusion from this effort is that the planned capabilities of the two facilities were essentially equal.

o Workload validation. Our workload methodology included analyzing the Test and Evaluation Master Plans (TEMPs), reviewing budget documents, and interviewing the program manager. The TEMP is an executive level document that is intended to identify the necessary developmental test and evaluation and operational test and evaluation activities and the major test events to be conducted. It outlines the needs for resources, such as test ranges, targets, expendable ordnance, and aircraft services. Accordingly, test schedules must be budgeted to preclude program cost overruns and program managers are responsible for meeting program milestones. We acknowledge that for various reasons all future test requirements may not get recorded in the TEMP or budgeted for. Accordingly, we have allowed for a 20 percent growth factor in Table 5.

We did not have the opportunity to verify the Navy and Air Force's revalidated workloads. However, their revised estimates support, rather than refute, our methodology in using TEMPs, budget documents, and discussions with program managers to validate workloads. For example, workloads were reduced 23 percent to 91 weeks and 46 percent to 82 weeks by the Navy and Air Force, respectively. The Navy had ACETEF revalidate their own projections, and the Air Force contacted program directors. Further, the two Services' revalidated workloads show that only four shifts (two per chamber) would be required to meet the combined workload. A two-shift operation accounts for 104 weeks per year. Details are shown below.

[illegible]

Weeks per year, Air Force	82
Weeks per year, Navy	<u>91</u>
Total combined workload	173
Additional 20 percent growth allowance	<u>35</u>
Grand Total Weeks Per Year	<u>208</u>
Weeks per year per chamber (208 divided by 2)	<u>104</u>

The Air Force revalidated all of the workload; however, the Navy limited the revalidation to the programs identified in the report. We applied the revalidated percentage to our universe to compute the 91 weeks per year.

o Reliance effort. The Reliance concept provides a step forward in reviewing and planning test capabilities and requirements. However, the conclusions reached by the Reliance groups are not always accurate. For example, in computing the projected workload for BAF, the Reliance group calculated a 190 week per year requirement, as shown on page 43 of the IDA report. This is greater than twice the Air Force's revalidated projection.

o Facility shifts. The issue of a fifth shift at ACETEF is a moot point since the Services' revalidated workload does not exceed a four-shift requirement. However, the Director's comments are misleading. The Navy provided documentation to show that four shifts were not the absolute maximum number that ACETEF could support. Further, the Navy's comment concerning the need for scheduling explained how it currently was possible to do the equivalent output of 1 1/2 shifts with only 1 shift of people. The Navy also provided documentation to show that the infrastructure (equipment) was in place to support multiple simultaneous tests in two chambers and a shielded hangar.

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B. CONSOLIDATION OF FACILITIES

The Navy and Air Force have investment plans to upgrade ACETEF and BAF, respectively, that could be accomplished more economically by relocating existing assets to satisfy a significant portion of their needs. Relocation of equipment had not been given adequate consideration by the Director and previous Reliance reviews. We identified specific equipment that, if redistributed, could save DoD approximately \$91 million while providing better control and a more efficient use of test assets.

DISCUSSION OF DETAILS

Background

In 1988, the Air Force requested reprogramming authority to shift \$52 million in funds provided for B-1B production to facilities to build BAF. The Commander, Air Force Systems Command (the Commander), testified before Congress that the Air Force already owned all the instrumentation needed for BAF and that the instrumentation would be moved to BAF. Members of Congress made repeated references to the Navy's ACETEF capabilities and planned investments. The Commander reassured Congress that the Air Force would transfer assets to BAF, thereby eliminating the requirement for additional investment, and that DoD would not end up with a redundant capability. The Commander further stated that the only additional cost would be for items specific to individual aircraft, such as power carts and cooling equipment, but not a modification to BAF for additional instrumentation. As of 1992 the only instrumentation transferred or relocated to BAF was a signal generator from the B-1 program; however, the Air Force has invested \$8 million in upgrades that included a new signal generator and a hoist.

Our review focused on four ECITFs (two Government facilities and two Government-owned contractor-operated facilities), as follows:

- o ACETEF, Naval Air Warfare Center - Aircraft Division, Patuxent River, Maryland
- o BAF, Air Force Flight Test Center, Edwards AFB, California
- o Air Force Electronic Warfare Evaluation Simulator (AFEWES), Air Force Plant No. 4, Fort Worth, Texas
- o Real-time Electromagnetic Digitally Controlled Analyzer and Processor (REDCAP), Calspan Corporation, Buffalo, New York

Planned ECITF Investments. The Navy is planning \$51 million in upgrades to the ACETEF, while the Air Force is planning \$179 million³ in upgrades to BAF. The \$179 million consists of \$40 million established in the future year defense plan specifically for upgrading the BAF, and the balance to be provided by programs such as the F-22. Ultimately, the Air Force wants to develop the BAF capability so it is comparable to that at ACETEF, as illustrated in appendix E, page 33. We identified government assets at defense contractors that could be used to offset the \$91 million of funds programmed for these upgrades. Specifically, the AFEWES and REDCAP test instrumentation should be relocated to the ACETEF and to BAF, thereby significantly enhancing ACETEF toward a Category I facility and upgrading the BAF toward a Category II facility. A description of the AFEWES and REDCAP capabilities follows.

AFEWES. This Government-owned, contractor-operated facility is a major electronic combat test asset managed by Air Force Developmental Test Center. The facility has been operated and maintained by General Dynamics Corporation, Fort Worth Division since its inception in 1958. The role of the AFEWES is to provide technical evaluations of electronic combat systems, such as electronic countermeasures systems (ECM), radar warning receivers, decoys, and techniques in a simulated threat environment. Currently, AFEWES has a large array of anti-aircraft artillery, surface-to-air missiles, anti-air missiles, and command, control, and communications threat system simulations against which ECM systems can be evaluated.

AFEWES simulations are one of two types: open loop or closed loop. Open loop simulators, such as the multiple emitter generator, provide a one-way path from the simulator to the electronic combat system and are used to evaluate electronic combat receiver/passive receivers in a dense emitter environment. Closed loop simulators, such as the SA-8 simulation, provide a two-way path between the threat simulator and the electronic combat system and are used to develop/optimize electronic combat techniques, evaluate low observables, maneuvers, and terrain masking/clutter effects.

REDCAP. This Government-owned, contractor-operated facility is a major electronic combat simulation asset that is used to evaluate actual electronic combat equipment, concepts, and tactics against foreign integrated air defense systems. It is located at Calspan Corporation's Advanced Technology Center in Buffalo, New York. REDCAP is a laboratory hybrid test resource that combines all the elements of an integrated air defense system with real-world signal densities in real time. The REDCAP facility houses a complex real-time simulator that represents the long-range future Soviet Union Airborne Warning and Control System threat to permit evaluation of penetration ECM techniques and equipment.

³ See page 10 for range of estimates for BAF.

REDCAP simulates the threat air defense system from radars that detect penetrators up to battle management and various weapons direction points. At key points, simulated weaponry is directed against the vehicles penetrating the air defense system.

Need for Consideration of Relocation

The Director has not adequately considered relocating existing test assets as an alternative to new investment at ACETEF and BAF. The Director, in June 1992, endorsed the Institute for Defense Analyses' cost comparison that recommends new investments for upgrading BAF capabilities. However, we believe a better alternative is to transfer assets at REDCAP and AFEWES, with an identified replacement value of \$303 million, to the ECITFs. These assets have been upgraded or are scheduled for upgrades which include all support documentation. Consolidating these assets would not degrade the integrity of individual capabilities and would permit greater utilization by integrating the various capabilities into a more complete test package.

Impact of Relocating Assets. We compared the existing capabilities at four test sites to determine the potential for consolidating fragmented test functions into ECITFs. The four sites and their capabilities are shown in Table 6.

Table 6.

Current Capabilities

<u>Capability</u>	<u>ACETEF</u>	<u>BAF</u>	<u>AFEWES</u>	<u>REDCAP</u>
Bomber Chamber		X		
Fighter Chamber	X			
Open Loop	X	X	X	X
Closed Loop	X		X	
Man-In-The-Loop	X			X
Red Integrated Air Defense Systems				X
Flight Simulator	X			
Infrared Lab			X	

Table 7.

Proposed Consolidation of Capabilities

<u>Capability</u>	<u>ACETEF</u>	<u>BAF</u>	<u>AFEWES</u>	<u>REDCAP</u>
Bomber Chamber		X		
Fighter Chamber	X			
Open Loop	X	X ¹		
Closed Loop	X ¹	X ¹		
Man-In-The-Loop	X	X ²		
Red Integrated Air Defense System	X ²	X ²		
Flight Simulator	X			
Infrared Lab	X ¹	X ¹		

¹ Transferred from AFEWES

² Transferred from REDCAP

Relocating selected integrated air defense systems, as identified in Table 7, would increase ACETEF's capabilities to a Category I facility and the BAF to a Category II facility.

Cost to Transfer Assets. We found that the Air Force Electronic Combat Office computed the cost for relocating AFEWES and REDCAP test instrumentation would be approximately \$20 million. This would include disassembling, packaging, shipping, and fabricating costs but excludes the purchase or replacement of contractor furnished equipment. Air Force Materiel Command developed an estimate of \$105 million for relocating AFEWES and REDCAP. However, our analysis disclosed \$54 million were allowed to upgrade the systems and the supporting documentation. In addition, \$20 million was estimated for facility preparation. The cost to upgrade is a separate issue from relocating. If it is necessary to upgrade these systems, that cost would be incurred if the equipment remained in its present location or is moved as recommended.

Accounting for Down Time. Relocation of tests assets is likely to have an adverse impact on customer test schedules but we have no basis for quantifying this factor. However, relocation of AFEWES and REDCAP test assets could be planned to coincide with scheduled upgrades when it would have the least impact on customer testing. We noted that a significant amount of the test equipment at both locations has been scheduled for upgrades.

Cost for Dedicated Lines. We investigated an alternative to transferring the test equipment which included data linking the AFEWES and REDCAP facilities, with dedicated lines to share capabilities between ECITFs. We found that data linking could not be used in tests requiring real-time processing that limits the distances between facilities using fiber optic lines to 1200 feet. Further, data linking through dedicated lines would cost approximately \$40 million. We found that air Force Materiel Command had developed cost of \$4 million to \$5 million for limited linking and \$10 million to \$12 million for comprehensive linking. In further support of these estimates, the Air Force Electronic Combat Office computed the cost for constructing each data link would be \$2.2 million. However, they acknowledged the main cost was not in constructing the links but in building the interfaces. As many as four dedicated lines would be required as follows:

- o REDCAP to AFEWES
- o REDCAP to AFEWES
- o REDCAP to BAF
- o AFEWES to BAF

Therefore, we concluded that data linking was neither practical nor economical.

Conclusion

Relocating selected integrated air defense systems test instrumentation assets from REDCAP to ACETEF would significantly increase Navy's ECITF capabilities and eliminate the expenditure of approximately \$51 million. Likewise, relocating AFEWES to BAF would significantly increase the Air Force's ECITF capabilities and avoid the expenditure of \$40 million for test instrumentation. Thus the combined effect for DoD would be a cost avoidance of \$91 million from FYs 1993 to 1996.

RECOMMENDATIONS FOR CORRECTIVE ACTION

We recommend that the Director, Test and Evaluation:

1. direct the Navy to accelerate and refine the electronic combat test plan study to assure that the cost, liabilities, benefits, and schedule for transferring Real-time Electromagnetic Digitally Controlled Analyzer Processor and Air Force Electronic Warfare Evaluation Simulator facilities' assets to Air Combat Environment Test and Evaluation Facility and Benfield Anechoic Facility are addressed and meet the Director's approval for compliance with Reliance goals, and

2. exercise oversight responsibilities to restrict new Air Force investments in Real-time Electromagnetic Digitally Controlled Analyzer Processor and Air Force Electronic Warfare Evaluation Simulator facilities (beginning with Fiscal Year 1993 funds) to preclude unwarranted improvements and duplication until the Navy Electronic Warfare Reliance study is completed.

MANAGEMENT COMMENTS

The Director's responses concurred with the intent of the finding stating that the disposition of the Real-time Digitally Controlled Analyzer and Processor (REDCAP) and the Air Force Electronic Warfare Evaluation Simulator (AFEWES), and the relationship of these facilities to the BAF and ACEFEF was under examination by an EW Reliance study team. He further stated that this examination may only need refinement to resolve disputes in the overall hardware-in-the-loop arena. The Director proposed alternatives to the draft report recommendations.

AUDIT RESPONSE TO MANAGEMENT COMMENTS

The Director's comments are responsive and the recommendations B.1 and B.2. have been revised to reflect this. However, the Director will have to refine the tasking given in March 1992 to address the relocation of the REDCAP and AFEWES assets to ACETEF and BAF.

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PART III - ADDITIONAL INFORMATION

- Appendix A - Prior Audits and Other Reviews
- Appendix B - Congressional Request
- Appendix C - Institute for Defense Analyses Report Deficiencies
- Appendix D - Programs Reviewed for Workload Validation
- Appendix E - Proposed Benefield Anechoic Facility Capability Compared to Air Combat Environment Test and Evaluation Facility
- Appendix F - Proposed Benefield Anechoic Facility Functions Compared to Air Combat Environment Test and Evaluation Facility Laboratories
- Appendix G - Cost Estimates for Benefield Anechoic Facility
- Appendix H - Summary of Potential Benefits Resulting from Audit
- Appendix I - Glossary
- Appendix J - Activities Visited or Contacted
- Appendix K - Report Distribution

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APPENDIX A: PRIOR AUDITS AND OTHER REVIEWS

DoDIG Report No. 88-201, "Aircraft Integrated Test Facilities," September 13, 1988.

The audit focused on anechoic chambers used for integrated electronic warfare testing. The auditors concluded that the Navy and Air Force were planning and funding integrated test facilities with unnecessary duplication of capabilities. The report recommended not building the large chamber at Edwards AFB and building a large chamber at Naval Air Test Center. The Air Force nonconcurred and obtained Congressional reprogramming authority to construct the large chamber at Edwards AFB during the resolution process.

DoD Electronic Warfare Test and Evaluation Investment Strategy Panel Report, "Electronic Warfare Test and Evaluation Investment Strategy Phase I Final Report," March 8, 1991.

The objectives of the panel were to define future electronic warfare test and evaluation capabilities to support the acquisition of major weapon systems within realistic fiscal limits, define areas of responsibilities among the Services, and lay out an investment strategy to upgrade and develop essential electronic warfare test and evaluation resources. The panel recommended expanding capabilities at Edwards AFB and modernizing ACETEF while not building a large chamber.

Deputy Director Defense Research and Engineering (Test and Evaluation) "Study of Anechoic Chambers Used to Support the T&E of Full Scale Systems," October 3, 1988.

The purpose of this study was to examine the utilization and the cost effectiveness of anechoic chambers and associated simulation facilities used for the test and evaluation of full-scale weapons systems and to propose OSD guidelines for their continuing development. The study recommended upgrading ACETEF to a Category I facility and developing the large chamber at Edwards AFB to a Category II facility. The study also recommended that a tri-Service team oversee joint acquisition and development of all Category I, II, and III facilities.

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APPENDIX B: CONGRESSIONAL REQUEST

Congress of the United States
Washington, DC 20515

August 4, 1992

**Mr. Derek J. Vander Schaaf
Deputy Inspector General
Department of Defense
400 Army-Navy Drive
Arlington, Virginia 22202-2884**

Dear Mr. Vander Schaaf,

We are writing to request your review of a report that was prepared by the Institute for Defense Analysis comparing the Navy's Air Combat Environment Test and Evaluation Facility (ACETEF) and the Air Force's Electronic Combat Integrated Test. We have reason to believe that the data relied upon in this report is inaccurate and, therefore, the conclusions of the report are flawed.

We would appreciate if you could review the data, analysis and conclusions of this study utilizing the knowledge and expertise of your Office and report your comments to us by August 31. Since this issue is a matter of importance in two committees that will be conferencing on this issue in early September, it is important that your report or briefing be received by August 31.

The IDA report also appears to adopt the premise relied upon by the Air Force that both ground testing and flight testing must be co-located. The Navy does not agree that such tests must be co-located. Please examine the success of both philosophies. We would be interested in your opinion on whether Navy's testing program has worked and whether it could work for Air Force. Please also examine what impact that would have on the conclusions reached in the IDA report.

A key question in this report is the cost of deploying the F-22 program to ACETEF. On page 52, these costs are estimated to be \$148 million, but on page 47, the deployment costs are listed at \$272 million. Are these costs accurate? Can the facilities at ECIT as they currently exist serve as the System Integration Lab (SIL) for the F-22? If not, what would it cost to provide this function? Were these costs considered in the report? Does the SIL for the F-22 need to be co-located with ACETEF, and if so are facilities at ACETEF capable of serving this function? If not, what would the projected costs be for accomplishing this function?

APPENDIX B: CONGRESSIONAL REQUEST (cont'd)

Mr. Derek Vander Schaaf
Page 2

August 4, 1992

This report also seems to be very susceptible to changes in the capacity requirements of the various services. In fact, if actual requirements are less, the report concludes that in certain circumstances, Alternative 2, building the large chamber at Pax River, would be the most effective option. Please examine the capacity requirements and based on your experience include what you believe to be the most accurate estimates.

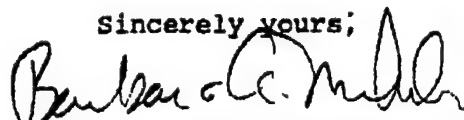
In your 1988 report you found that without the large chamber, it would cost \$340 million to duplicate capability now available at Pax at the ECIT facility. The IDA report concludes that these costs are \$168 million. What are the costs to the best of your information?


Also in your 1988 report, you concluded that a large chamber should not be constructed at Edwards, and that it made more sense to construct such a chamber at Patuxent. The issue now appears to be even though your original recommendation was ignored, is it still your opinion that the cheapest, fastest and lowest risk strategy for accomplishing the goal of establishing the first fully integrated National Asset for integrated testing is to complete ACETEF?

We appreciate your attention to this request and your timely review of this document.

Sincerely yours;


PAUL SARBANES


BARBARA MIKULSKI


STENY HOYER

APPENDIX C: INSTITUTE FOR DEFENSE ANALYSES REPORT DEFICIENCIES

Page viii:

Statement: Four alternatives are developed by IDA to satisfy Navy and Air Force capability options. Of the four, Alternative 2 builds a large anechoic chamber at ACETEF and would operate at 2 shifts a day, while Alternative 3 develops the ECIT and would operate at 2.5 shifts per day.

Correction: We found that the capacity for Alternative 2 was understated; that is, it should also show an operating capacity of 2.5 shifts per chamber. IDA could not provide us with documentary support for its rationale in limiting Alternative 2 to four shifts per day. The significance of limiting the shifts to two is to show a significant disproportionate capacity capability between the ACETEF and the ECIT that favors the ECIT operation.

Page xiii:

Statement: "However, developing the ECIT capability would satisfy 25% more requirements than building an LAC at ACETEF."

Correction: Capability is in relation to the number of shifts assigned each alternative, thus adding a fifth shift to ACETEF to equal the shifts for ECIT would eliminate the capacity difference.

Page 8:

Statement: "Costs already incurred for existing resources (e.g., facilities, equipment) were considered to be sunk costs and, accordingly, were not included in the analysis."

Correction: The Navy has invested \$249 million in ACETEF for laboratories, and the Air Force has invested \$52 million in BAF for a large chamber. The Air Force's proposed \$168 million investment represents a duplication of ACETEF capabilities, as shown on page 49 of the IDA report.

Page 13:

Statement: "The two principal facilities under review in this study are two Category II facilities:..."

Correction: ACETEF is a Category II facility while ECIT is considered a Category III facility. IDA correctly identified ECIT as a Category III Facility on page 15.

Page 20:

Statement: "Further, the size of the (ACETEF) chamber would appear to limit stimulation methodology to signal injection

APPENDIX C: INSTITUTE FOR DEFENSE ANALYSES REPORT DEFICIENCIES
(cont'd)

and/or the use of 'antenna hats.' Free-space, far-field radiation is not possible."

Correction: Tests requiring free-space have been accomplished at ACETEF and can be performed in the future if the customer so requests. Further, the Navy's proposed large chamber could be built to meet all national needs. IDA informed us that its statement was based on discussions with the Air Force.

Page 26:

Statement: "In addition, the current ACETEF closed-loop capability does not cover all Air Force threat requirements."

Correction: This statement is correct only because the threat simulators have not been developed by DoD's responsible agency.

Statement: "Finally, the closed-loop capability available at ACETEF is oriented toward sea-based threats, and is of less value in measuring the performance of systems under test against land-based threats."

Correction: This difference between the types of threats is negligible according to the OSD program office responsible for threat simulator development.

Page 28, 32, 49

Statement: "Although approved funding was \$60 million, the estimated cost is about \$72 million." (Pertaining to generic capability)

Statement: "The above capabilities (generic) are all within the \$60 million proposed program."

Statement: "The generic upgrade program is \$71.9 million."

Correction: The above statements contain a contradiction in defining the cost for generic capabilities.

Page 69:

Statement: "The Chesapeake Test Range at Patuxent Naval Air Station is considered to be too small and congested for additional high-performance AIR FORCE flight testing."

"The cost of deploying the F-22 to ACETEF for electronic combat/avionics ground testing offsets the cost of developing an expanded ECIT at Edwards AFB."

APPENDIX C: Institute for Defense Analyses Report Deficiencies
(cont'd)

Correction: IDA could not substantiate this opinion.

Page 70:

Statement: "The IDA analysis shows that building BAF rather than a large chamber at ACETEF is the most cost-effective, lowest risk alternative. While both options would add the capability to test large aircraft, the ECIT at Edwards would provide the most flexibility to adjust to an uncertain workload and would add more total capacity at less cost per unit. It supports the current AIR FORCE philosophy of collocating ground and flight testing, and provides a needed additional source of test capability."

Correction: IDA's analysis was flawed. The correct data shows that Alternative 2 is the most cost effective.

Page D-5:

Statement: "The estimate of the total cost through FY 2000 in this scenario is \$143 million constant FY 1992 budget dollars, roughly half the SYSTEMS PROGRAM OFFICE estimate."

Correction: Table D-3 on page D-6 indicates a total of \$148.3 million, the correct amount.

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APPENDIX D: PROGRAMS REVIEWED FOR WORKLOAD VALIDATION

NAVY

Fiscal Years 1994 - 1996
[Workload in Weeks (Days)]

<u>PROGRAM</u>	<u>FORECAST*</u>		<u>CONFIRMED</u>	
	<u>DAYS</u>	<u>WEEKS**</u>	<u>DAYS</u>	<u>WEEKS**</u>
ASEMICAP ⁴	110	7.3	110	7.3
ASPJ ⁵	264	17.6	14	.9
F/A-18	120	8.0	90	6.0
AH-1W	35	2.3	35	2.3
Unmanned Aerial Vehicle	120	8.0	-0-	-0-
H-2 & H-60 (ASW HELO) ⁶	50	3.3	-0-	-0-
A-6E	50	3.3	-0-	-0-
EA-6B	70	4.6	70	4.6
F-14	90	6.0	-0-	-0-
EP-3	60	4.0	150	10.0
V-22	198	13.2	66	4.4
SEEK SPARTAN	55	3.6	-0-	-0-
H-53	20	1.3	-0-	-0-
E-2C	40	2.6	-0-	-0-
E-6A	35	2.3	-0-	-0-
P-7	60	4.0	-0-	-0-
ES-3A	35	2.3	-0-	-0-
P-3	50	3.3	-0-	-0-
TOTAL	<u>1462</u>	<u>97.0</u>	<u>535</u>	<u>35.5</u>

* We reviewed 82 percent of the total forecasted workload of 1792 days.

** The Navy provided workload was in days over a three-year period that was converted to average weeks per year. The average weeks per year was arrived at by dividing the total days by three and then by five. For example, ASEMICAP:

110 days divided by 3 years = 36.7 days divided by 5 days = 7.3 weeks per year.

Audit confirmed 37 percent of forecast workload (535/1462).

⁴ Air Systems Electromagnetic Interference Corrective Action Program

⁵ Advanced Self Protection Jammer

⁶ Anti-Submarine Warfare Helicopter

APPENDIX D: PROGRAMS REVIEWED FOR WORKLOAD VALIDATION (cont'd)

AIR FORCE

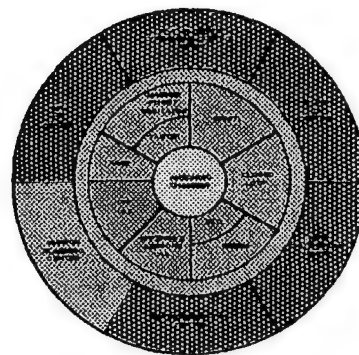
	<u>Fiscal Years 1995 - 2005</u> <u>(Workload in Weeks)</u>	
<u>PROGRAM</u>	<u>FORECAST*</u>	<u>CONFIRMED</u>
MC-103H	12	6
AC 130U	6	4
CV-22	12	3
EC-130	20	6
F-16	10	10
F-22	10	10
E-3A	5	2
Joint STARS ⁷	5	0
EF-111	11	0
F-111	9	0
F-15	<u>11</u>	<u>0</u>
TOTAL	<u>111</u>	<u>41</u>

* We reviewed 87 percent of the total forecasted workload of 127 weeks.

Audit confirmed 37 percent of forecast workload (41/111).

⁷ Joint Surveillance Target Attack Radar System

ELECTRONIC COMBAT INTEGRATED TEST PROGRAM

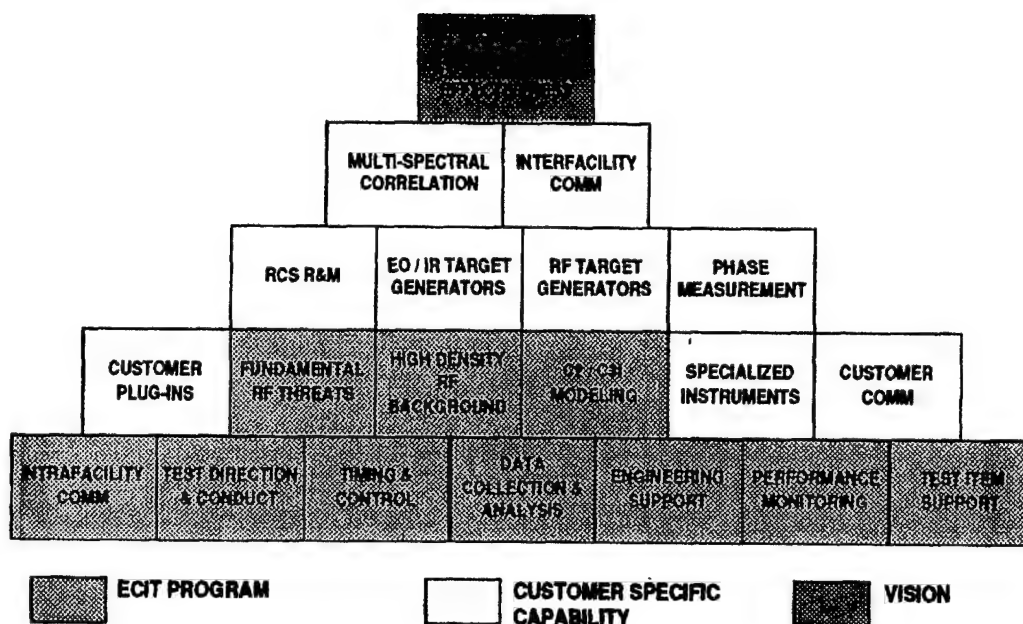
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ACETEF

33

**APPENDIX E: PROPOSED BENEFIELD ANECHOIC FACILITY CAPABILITY
COMPARED TO AIR COMBAT ENVIRONMENT TEST AND
EVALUATION FACILITY (cont'd)**

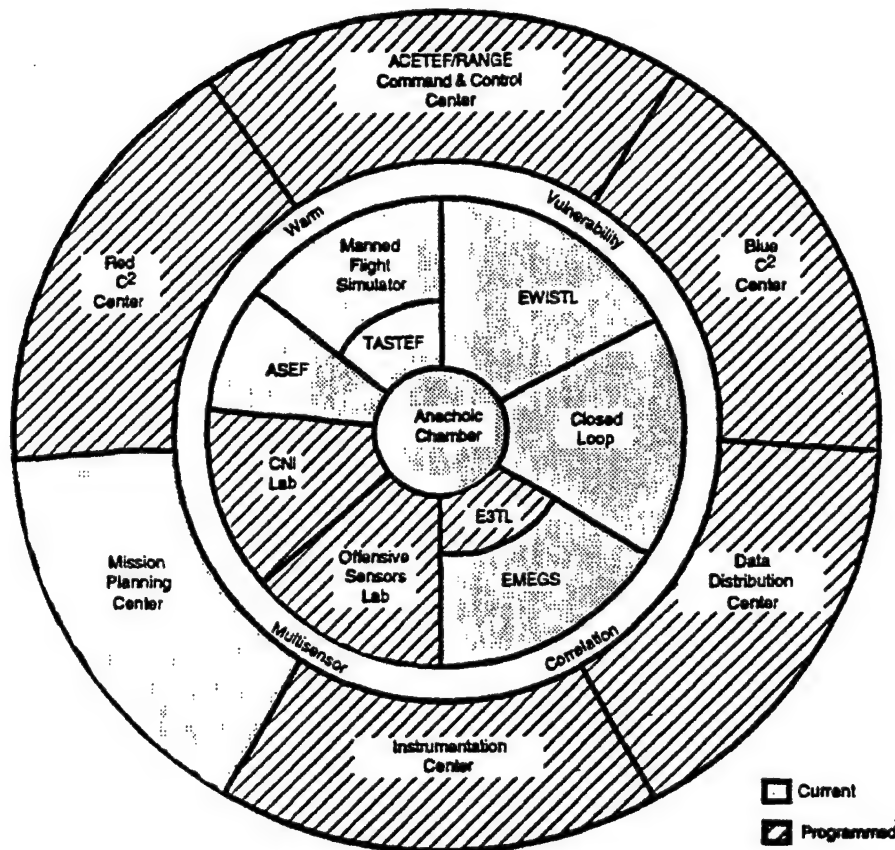
**Benefield Anechoic Facility
Proposed Capabilities**



c²/c³I...Command and Control/Command, Control, Communications,
and Intelligence
EO/IR....Electro-Optical Infrared
RF.....Radio Frequency
RCS R&M..Radar Cross Section Repair and Maintenance

**APPENDIX E: PROPOSED BENEFIELD ANECHOIC FACILITY CAPABILITY
COMPARED TO AIR COMBAT ENVIRONMENT TEST AND
EVALUATION FACILITY (cont'd)**

**Air Combat Environment Test and Evaluation Facility
Current and Proposed Capabilities**



ASEF....Air Systems Evaluation Facility
 CNI.....Communications, Navigation, Identification
 C².....Command and Control
 E³TL....Electromagnetic Environment Effects Test Lab
 EMEGS...Electromagnetic Environment Generating System
 EWISTL..Electromagnetic Warfare Integrated Systems Test
 Laboratory
 TASTE..Tactical Avionics and Software Test and Evaluation
 Facility

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**APPENDIX F: PROPOSED BENEFIELD ANECHOIC FACILITY FUNCTIONS
COMPARED TO AIR COMBAT ENVIRONMENT TEST AND
EVALUATION FACILITY LABORATORIES**

DISTRIBUTION OF ECIT BLDG BLOCK FUNCTIONS ACROSS ACETEF LABS*

TASK DESCRIPTION: This matrix is in response to a request from Mr. Steve Hughes, DoDAG, that a mapping of the ECIT "Building Blocks" to the ACETEF "Wagon Wheel" be provided.										
ECIT**		ACETEF**								
BB #	BB Function	Chamber	OCC	OSL	EWISTL	E3TL	CW	AFS	CL	ASEF
0	Facilities	X								
1	Intrafacility Comm		X	X	X	X	X	X	X	X
2	Test Direction & Conduct		X	X	X	X	X	X	X	X
3	Timing & Control		X	X	X	X	X	X	X	X
4	Data Collection & Analysis		X	X	X	X	X	X	X	X
5	Engineering Support		X	X	X	X	X	X	X	X
6	Performance Monitoring		X	X	X	X	X	X	X	X
7	Test Item Support			X	X	X	X	X	X	X
8	Fundamental RF Threats				X				X	
9	High Density RF Background				X	X				
10	C2/C3I Modeling		X		X		X	X	X	X
11	Customer Plugins			X	X	X	X	X	X	X
12	Specialized Instruments			X	X	X	X	X	X	X
13	Customer Comm		X					X		
14	RCS R&M									
15	EO/IR Target Generators			X						
16	RF Target Generators			X	X		X		X	
17	Phase Measurement				X					
18	Multi-Spectral Correlation		X	X	X		X(1)	X		X
19	Interfacility Comm		X							
(1) Provides track files and ID information										
* Developed by Edwards personnel and concurred by Pax River personnel.										
** An "X" does not necessarily indicate an equivalence in capability between an ECIT BB function and an ACETEF lab capability. It does indicate that this function either exists or is under development by an ACETEF laboratory.										

C²/C³I.....Command and Control/Command, Control
Communications, and Intelligence
EO/IR.....Electro-optical/Infrared
RCS R&M....Radar Cross Section Repair and Maintenance
RF.....Radio Frequency

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APPENDIX G: COST ESTIMATES FOR BENEFIELD ANECHOIC FACILITY



ELECTRONIC COMBAT INTEGRATED TEST PROGRAM

FUNDS REQUIRED

CAPABILITY	PRIOR YRS	FY91	FY92	FY93	FY94	FY95	FY96	FY97	OUT YRS	TOTAL
GENERIC	2.4*	3.4	10.0	10.0	10.0	10.0	10.0	10.0	25.0	65.8
F-16 SPECIFIC		0.5	5.5							14.0
ECIT PDP			22.7	25.1	25.5	23.9	23.9	26.9		150.0
SHORTFALL FOR THE PDP			7.2	15.1	17.5	13.9	13.5	15.9		84.5
ADDITIONAL SHORTFALL FOR THE VISION					43.8	30.0	30.0	30.0	100.0	233.8

* \$1.5M OF AFFTC DOA

TOTAL ECIT ESTIMATE 398.1

DOA.....Direct Obligation Authority
PDP.....Program Decision Package

APPENDIX G: COST ESTIMATES FOR BENEFIELD ANECHOIC FACILITY
(cont'd)

ECIT Investment Costs
(Constant FY1992 Dollars in Millions)

	Equivalent ACETEF Capability	Future Costs
ECIT		
Generic (Facility Infrastructure)		
Anechoic chamber cluster	EWISTL	28.0
Management, control	OCC	10.5
Other	Multiple	14.8
Program management	Multiple	18.6
Total generic program		71.9
Full Function Category 2 ISTF		
Building construction (MILCON)		
Aircrew Systems Evaluation Facility		13.3
Lab construction (RDT&E)	ASL	
MFS cluster		72.8
CNI cluster	MFS+ASEF	17.2
Electro-optical/Infrared cluster	CNI	20.8
RF/Electronic warfare cluster	OSL	
Management and control	Multiple	1.9
Adjustments	OCC	
Double counting of equipment interfaces		-14.8
Anticipated price reduction ^a		-14.7
Total long-term program		96.5
Total generic plus long-term programs		168.4

^a 15% of historical cost of EWISTL, MFS, ASL, OCC, OSL, and CNL

ASEF.....Aircrew Systems Evaluation Facility
CNI.....Communication, Navigation, Identification
EWISTL.....Electronic Warfare Integrated Systems Test Laboratory
MFS.....Manned Flight Simulator
MILCON.....Military Construction
OCC.....Operations and Control Center
OSL.....Offensive Sensors Laboratory

APPENDIX G: COST ESTIMATES FOR BENEFIELD ANECHOIC FACILITY
(cont'd)

ECIT ESTIMATED INVESTMENT BY BUILDING BLOCKS (\$K-FY92)

BB#	Building Block Description	BAF Baseline	F-16 Upgrades	ECIT Program Upgrades	Facility Upgrades	Customer Specific Upgrades
0	Facilities*	52000.0			25000.0	
1	Intrafacility Comm	Included in Facilities		6619.0		
2	Test Direction & Conduct			6300.0		
3	Timing & Control			8630.0		
4	Data Collection & Analysis	Included in Facilities	1867.0	6300.0		
5	Engineering Support			4950.0		
6	Performance Monitoring	Included in Facilities		550.0		
7	Test Item Support	Included in Facilities	1249.0	2750.0		
8	Fundamental RF Threats	Included in Facilities	4407.0	12950.0		2880.0
9	High Density RF Background			1500.0		500.0
10	C2/C3I Modeling			2800.0		3600.0
11	Customer Plugins					Not an ECIT Cost
12	Specialized Instruments					6100.0
13	Customer Comm					360.0
14	RCS R&M					2000.0
15	EO/IR Target Generators					7500.0
16	RF Target Generators					19800.0
17	Phase Measurement					16000.0
18	Multi-Spectral Correlation					6300.0
19	Interfacility Comm					Not an ECIT Cost
20	Program Office*		386.0	5538.0		2880.0
21	Engineering Support*		300.0	13200.0		5760.0
	Total	52000.0	8209.0	72087.0	25000.0	73680.0
	* Not included as a block on the building block chart.	TOTAL BUILDING BLOCK ESTIMATED COST: 178978.0				

C²/C³I.....Command and Control/Command, Control, Communications,
and Intelligence
EO/IR.....Electro-optical/Infrared
RF.....Radio Frequency

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APPENDIX H: SUMMARY OF POTENTIAL BENEFITS RESULTING FROM AUDIT

<u>Recommendation Reference</u>	<u>Description of Benefit</u>	<u>Amount and/or Type of Benefit</u>
A.1.	<u>Economy and Efficiency.</u> Correction of data upon which decisions are made.	Nonmonetary.
A.2.	<u>Economy and Efficiency.</u> Explore alternatives discussed in Finding B prior to making further investments.	Nonmonetary.
B.1.	<u>Economy and Efficiency.</u> Reduce expenditure for test assets until incorporation of Reliance Study.	<u>Funds Put to Better Use.</u> \$91 million of RDT&E funds over Future Years Defense Plan.
B.2.	<u>Economy and Efficiency.</u> Provide oversight in selected Air Force test facilities.	Nonmonetary.

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APPENDIX I: GLOSSARY

Anechoic Chamber. An enclosure with external walls of a RF shielding material and internal walls lined with material which attenuates (absorbs) electromagnetic energy. The RF shielding material isolates the chamber interior from external magnetic and radio-wave interferences and also serves to contain internally generated radio-wave signals within the interior of the chamber. The internal lining attenuates radio waves striking the chamber walls and thus approximates a "free space" electromagnetic energy environment, such as that surrounding an aircraft in flight.

Avionics. Electronic instrumentation for controlling aircraft and weapon systems.

Closed-Loop Testing. A form of electronic combat testing in which both the friendly and threat systems react to each other's actions. For example, in a test of a friendly jammer against a threat missile radar, the friendly system receives and identifies the missile radar emissions and begins jamming. This, in turn, is detected by the missile radar causing it to initiate measures to minimize any detrimental effects on its own performance.

Electromagnetic Compatibility. The capability of electrical and electronic systems, equipment, and devices to operate in their intended electromagnetic environment within a defined margin of safety and at design levels of performance without suffering or causing unacceptable degradation as a result of electromagnetic interference.

Electromagnetic Environmental Effects. The impact of the electromagnetic environment upon the operational capability of military forces, equipment, systems, and platforms. It encompasses all electromagnetic disciplines, including electromagnetic compatibility/interference; electromagnetic vulnerability; electromagnetic pulse; electronic counter-countermeasures; hazards of electromagnetic radiation to personnel, ordinance, and volatile materials; and effects of natural phenomena, such as lightning.

Electromagnetic Interference. Any electromagnetic disturbance, whether intentional or not, that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronic or electrical equipment.

Electronic Combat. Action taken in support of military operations against the enemy's electromagnetic capabilities. Electronic combat includes electronic warfare; elements of command, control, and communications countermeasures; and suppression of enemy air defenses.

APPENDIX I: GLOSSARY (cont'd)

Electronic Combat Integrated Test Facility. An enclosed, secure facility for the test and evaluation of electronic systems on aircraft and missiles. It is an anechoic chamber with instrumentation and laboratories that simulates the environment in which the test article operates.

Electronic Countermeasures. The area of electronic warfare involving actions taken to prevent or reduce the enemy's effective use of the electromagnetic spectrum. It includes electronic jamming and electronic deception.

Electronic Warfare. Military action involving the use of electromagnetic energy to determine, exploit, reduce, or prevent hostile use of the electromagnetic spectrum and action which retains friendly use of the electromagnetic spectrum.

Hardware-in-the-Loop Testing. Electronic combat testing in which the test system hardware is tested and evaluated against closed-loop threat simulations.

Installed Test Facilities. Test resources which provide the capability to test EC systems while installed on, or integrated with, host platforms.

Man-in-the-Loop Testing. Electronic combat test simulations using manned equipment in which the human interaction plays a role in the test scenario.

Many-on-Many Testing. The simulation of a major war-time battle with several types and numbers of friendly (blue) forces engaged against several types and numbers of enemy (red) forces.

Multi-Spectral Testing. Electronic combat testing that evaluates weapons that use more than one area of the electromagnetic spectrum. Examples are radio (radar), infrared, ultraviolet, and millimeter waves.

Open-Loop Testing. Electronic combat testing involving scenarios in which only one system is allowed to interact with another's actions. For example, in the test of a jammer against a missile, emissions of the missile are received by the jammer, which begins jamming. The missile simulations are not allowed to receive and react to the jammer's signals.

Radio Frequency. In electronic combat this term applies to avionics and weapons systems that operate on the radio wave section of the electromagnetic spectrum. This includes radar and radio voice systems.

Reprogramming Action. In Government budgeting this refers to the transfer of funds appropriated for a certain purpose to another use. It requires the concurrence of Congress.

APPENDIX J: ACTIVITIES VISITED OR CONTACTED

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition, Washington, DC
Director, Test and Evaluation, Washington, DC

Department of the Army

Assistant Secretary of the Army (Financial Management),
Washington, DC
Test and Evaluation Command, Aberdeen Proving Ground, MD
Electronic Proving Ground, Fort Huachuca, AZ

Department of the Navy

Assistant Secretary of the Navy (Financial Management),
Washington, DC
Director of Navy Test and Evaluation and Technology Requirements,
Washington, DC
Naval Air Systems Command, Arlington, VA
Naval Air Warfare Center, Aircraft Division, Patuxent River, MD
Naval Air Warfare Station, China Lake, CA
Naval Air Warfare Station, Point Mugu, CA

Department of the Air Force

Assistant Secretary of the Air Force (Acquisition),
Washington, DC
Assistant Secretary of the Air Force (Financial Management
and Comptroller), Washington, DC
Director, Air Force Test and Evaluation, Washington, DC
Air Force Materiel Command, Wright-Patterson AFB, OH
Air Warfare Center, Kirtland AFB, NM
Warner Robins Air Logistics Center, Robins AFB, GA
Sacramento Air Logistics Center, McClelland AFB, CA
Air Force Developmental Test Center, Eglin AFB, FL
Air Force Flight Test Center, Edwards AFB, CA
Joint STARS System Program Office, Hanscom AFB, MA

Non-Government Activities

Calspan Corporation, Buffalo, NY
Real-Time Electromagnetic Digitally Controlled Analyzer and
Processor, Buffalo, NY
General Dynamics, Ft. Worth, TX
Air Force Electronic Warfare Evaluation Simulator,
Fort Worth, TX
Grumman Corporation, Melbourne, FL
Institute for Defense Analyses, Alexandria, VA
McDonnell Douglas Corporation, St. Louis, MO

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APPENDIX K: REPORT DISTRIBUTION

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition
Director, Test and Evaluation

Department of the Navy

Secretary of the Navy
Assistant Secretary of the Navy (Financial Management)
Assistant Secretary of the Navy (Research, Development, and
Acquisition)
Comptroller of the Navy
Naval Air Systems Command
Director of Navy Test and Evaluation and Technology Requirements

Department of the Air Force

Secretary of the Air Force
Assistant Secretary of the Air Force (Acquisition)
Assistant Secretary of the Air Force (Financial Management
and Comptroller)
Director, Air Force Test and Evaluation

Non-DoD Federal Organizations

Office of Management and Budget
U. S. General Accounting Office, NSIAD Technical Information
Center

Congressional Committees:

Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Governmental Affairs
Ranking Minority Member, Senate Committee on Appropriations
House Committee on Appropriations
House Subcommittee on Defense, Committee on Appropriations
Ranking Minority Member, House Committee on Appropriations
House Committee on Armed Services
House Committee on Government Operations
House Subcommittee on Legislation and National Security,
Committee on Government Operations

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PART IV- MANAGEMENT COMMENTS

Office of the Under Secretary of Defense for Acquisition

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Office of the Under Secretary of Defense for Acquisition Comments

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ACQUISITION

OFFICE OF THE UNDER SECRETARY OF DEFENSE
WASHINGTON, DC 20301

16 SEP 1992

MEMORANDUM FOR DIRECTOR, ACQUISITION MANAGEMENT DIRECTORATE,
DoD(IG)

SUBJECT: Draft Audit Report on Electronic Combat Integrated
Test Facilities (Project No. 2AB-0025)

I have reviewed the subject report and Service comments (attached) that dispute your findings and recommendations, and I do not concur in your recommendations.

Your audit is based on assumptions relating to current or past generation avionics technology systems, in particular electronic combat (EC) subsystems. The new generation of integrated avionics systems requires a new test methodology and associated capabilities. The F-22 is not simply the driver of the Institute for Defense Analyses (IDA) report or your audit. Rather, it is the forerunner of integrated systems challenges to come. Future avionics systems will generate, process and integrate data at rates that are orders of magnitudes greater than today's federated systems. Today's test capabilities are inadequate to test these systems efficiently; and sufficient data can not possibly be generated through field testing alone. Consequently, a new approach is needed. Hence, the advent of integrated systems test facilities (ISTFs) or ECITs, as referred to in your audit, with collocated field test capabilities. This is the direction of the future for the Department from both a cost/efficiency and effectiveness standpoint. In the aircraft arena, future systems will need such support/test capabilities and, wherever feasible, we should strive for collocation with field test capabilities.

Sufficient questions have been raised with regard to your workload validation methodology and ACETEF shift assumptions to convince me that neither the ECIT facility design nor the ACETEF development activities should be halted. As indicated in the attached Service comments, Test and Evaluation Master Plans (TEMPS) and program manager budget documentation are not dependable sources for long-term test resource planning or requirements validation. Each Service has revalidated sufficient workload to justify Integrated System Test Facilities at each of the (two) principal Service aircraft developmental test sites, particularly in view of next-generation integrated systems.

These comments are not included in Part IV but are available upon request.

4, para 2

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To overcome the limitations of the TEMP, we have encouraged individual and multi-Service, systematic approaches to long range (5 years +) test resource planning. Each Service now has such a system and all are working together (since 1988) through the Joint Commanders Group (Test and Evaluation) to conduct joint reviews. Consequently, I have confidence that their workload estimates are more representative than yours.


In addition, in response to DMRD 922, we have gone a step further and installed a Reliance approach to test resource planning. Reliance provides for the identification of single-Service resource planners for the Department and greater interdependence among the Services. This process, even in its early stages, has borne out the need for the two primary facilities that are the focus of Part II. A. of your audit.

6, para 1

One other key assertion in your findings must be challenged - the facility shift(s) assumption. We are not aware of any analysis that would support five shifts at the Air Combat Environment Test and Evaluation Facility (ACETEF) or its associated chamber. To the contrary, the Navy maintains that even four shifts would require the right combination of customer needs and optimal scheduling of both people and equipment. The number of shifts available at ACETEF is not simply a matter of summing potential shift work at two separate locations - ECIT and ACETEF.

The disposition of the Real-Time Digitally Controlled Analyzer and Processor (REDCAP) and Air Force Electronic Warfare Evaluation Simulator (AFEWES), and the relationship of these facilities to the Electronic Combat Integrated Test (ECIT) facility and the Air Combat Environment Test and Evaluation Facility (ACETEF) are under examination. I directed a study last March (Tab B) in response to FY 92 Authorization Conference tasking. That study addresses this area among other electronic combat test capabilities and may only need refinement to resolve disputes in the overall hardware-in-the-loop arena.

My proposed changes to your recommendations, as discussed with your auditors are provided at Tab A. Service comments are provided at Tab C for your information and consideration.


Charles E. Adolph
Director
Test and Evaluation

Attachments

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OFFICE OF THE INSPECTOR GENERAL

PROJECT NO. 2AB-0025
1992

September 1,

DRAFT REPORT
ON ELECTRONIC COMBAT INTEGRATED TEST FACILITIES

Recommendation Issues:

PART II - FINDINGS AND RECOMMENDATIONS

A. Deficient Cost Analysis

RECOMMENDATIONS FOR CORRECTIVE ACTION

NONCONCUR

I propose that this recommendation be changed to read:

We recommend that, due to questions raised in regard to the Institute for Defense Analyses cost analysis report, the Director, Test and Evaluation:

Limit Air Force ECIT activities to those associated with the update and validation of design efforts, and the development of an overall architecture and associated milestones until the electronic combat test plan study tasked by the Director's 30 March 1992 memorandum, and conducted by the Department's Reliance Lead, is completed.

11, para 2

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PART II - FINDINGS AND RECOMMENDATIONS

B. Consolidation of Facilities

RECOMMENDATIONS FOR CORRECTIVE ACTION

NONCONCUR

I propose that this recommendation be changed to read:

We recommend that the Director, Test and Evaluation:

18, para 4

1. direct the EW Reliance Lead to accelerate and refine the electronic combat test plan study effort cited above, as necessary, to ensure that the advisability, cost, liabilities, benefits and schedule for the transfer of assets such as REDCAP and AFEWES are evaluated and meet the Director's approval for compliance with Reliance goals.

19, para 1

2. exercise oversight responsibilities to restrict new Air Force investments in the REDCAP facility (beginning with FY 93 funds) to preclude unwarranted improvements and duplication until the electronic combat test plan study effort addresses this issue.

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OFFICE OF THE DIRECTOR OF
DEFENSE RESEARCH AND ENGINEERING

WASHINGTON, DC 20301

30 MAR 1992

MEMORANDUM FOR MEMBERS OF THE DEFENSE T&E STEERING GROUP (DTESG)

SUBJECT: Tactical Electronic Combat Development and Testing

Reference the Air Force, Director Test and Evaluation, 26 February 1992 memorandum on the same subject, our February 10, 1992, Test and Evaluation Resource Committee (TERC) memorandum (attached) reported on "Tiger" team actions to address the electronic combat tasking in the FY 93 Authorization Conference language. The "Tiger" team was formed at the direction of the DTESG at the December 16, 1991, meeting.

Attached to the TERC memorandum is a three part schedule that lays out milestones for EW Reliance coordination and, in particular, for the Authorizations Conference language tasking emphasizing the need to "devote special attention to duplication of capabilities and opportunities to consolidate redundant and duplicative testing and simulation facilities." The lynch pin in that schedule was the coordination and approval of the EW Reliance study, which was to form the basis for our initial May 1, 1992, reply to Congress. A more in depth plan addressing their concerns for consolidation would follow coincident with the FY 94/95 President's Budget.

At the February 12, 1992, DTESG meeting, I was informed that the Services were not reaching closure on the study and that a "directed" decision might be required, if no movement was observed. Consequently, the schedule attached to our February 10, 1992, TERC memorandum has been overtaken by events.

I have recently been advised that the Air Force and the Navy have reached agreement on the EW Reliance lead arrangements. That is, a biennial rotating lead, with the Navy being the initial lead.

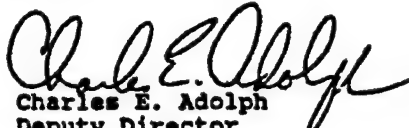
I concur in this approach and applaud the efforts of the parties involved to reach a compromise in this sensitive and important area. I believe it provides a sound basis for us to respond to the Authorization Conference tasking cited above.

Moreover, I agree with the implications of the Authorization Conference language. There is not enough money to go around to adequately equip our many EC test capabilities; and we should have a common EC test methodology, and a related DoD EC test investment master plan. Accordingly, in view of the agreement on EW Reliance lead cited above, I am tasking the Navy to lay out a

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milestone plan and to develop (in concert with the other Services) a DoD EC test capability investment master plan responsive to the concerns of the Authorizations Conference language. That milestone plan should be presented at the April 3, 1992, DTESG meeting.

The Navy will use any alternatives specified by the T&E principals at the DTESG meeting, the Electronic Warfare Test and Evaluation Investment Strategy Capstone Report and such other sources as they may deem appropriate to develop the aforementioned EC test capability investment master plan. Results of this effort will be briefed through the Joint Commanders Group (Test and Evaluation) and to the DTESG to arrive coincident with the FY 94 Budget Estimate Submission (September 15, 1992), so that they may be incorporated with Program Budget Decisions made at that time.


Charles E. Adolph
Deputy Director
(Test and Evaluation)

Attachment

CC:
DUSD(A)
OSD(C)

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OFFICE OF THE DIRECTOR OF
DEFENSE RESEARCH AND ENGINEERING

WASHINGTON, DC 20301

FEB 10 1992

MEMORANDUM FOR TEST AND EVALUATION RESOURCE COMMITTEE (TERC)

SUBJECT: Authorization Conference Report Tasking to Develop an
Electronic Combat (EC) Test Capability Master Plan

The "tiger" team set up, as agreed to at the December 16, 1991, DTESG meeting, has met twice to address the subject tasking.

We held our initial organizational meeting on December 20, 1991, to confirm the form and content of the report (outlined at the DTESG meeting) due to the Congress on May 1, 1992. We agreed the EW Reliance report (edited) and the signed EW Reliance MOA, along with a transmittal memorandum from the Secretary, would form the basis for the May 1, 1992, report to the Congress. In addition, team members were asked to develop a milestone schedule to achieve coordination of the EW Reliance report and MOA through the "T&E Principals" by March 4, 1992.

We held our second meeting at IDA on December 31, 1991, to receive reports on Service milestone schedules for EW Reliance coordination. We agreed that March 4, 1992, coordination was achievable. Although the Navy was not represented at the meeting, I was advised separately that they would have no problem meeting the March suspense.

The Authorizations Conference Report also contains language requiring an "overall electronic combat test strategy" that should be expanded to include all "DoD electronic combat development and testing facilities" with "special attention to duplication of facilities and opportunities to consolidate ... facilities within each component." We agreed that the desired approach to this aspect of the tasking (again as outlined in the DTESG meeting cited above) was to address such consolidation issues during the normal course of the POM/President's Budget development and review process.

However, the team was unanimous in their position that we could not wait for either the EW Reliance report to be coordinated (March 4) or the POM submission (April 1) to begin developing costs, savings, advantages and disadvantages, etc., to specific consolidation alternatives or the formulation of other consolidation options and have any hope of meeting nominal budget review time-lines. Accordingly, the team recommended that DDDRE(T&E) provide tasking early (first week of February) for the "proposed" Reliance lead and any parallel contractor study effort to flesh-out appropriate alternatives.

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A milestone chart is attached that identifies EW Reliance approval dates, schedules for development of the May 1, 1992, response to the Congress, and schedules for the formulation and review of electronic combat consolidation alternatives. Any comments on or disagreement with the milestones identified should be provided to me by February 12, 1992. In the absence of any comments, we will proceed with the schedule as outlined on the attached chart.

The "tiger" team should plan on meeting once every two weeks to review progress and address any issues that may arise. I will notify team members of meetings.

Parker C. Horner

Parker C. Horner
Executive Secretary
Test and Evaluation Resource Committee

Approval *AMB*

Attachment

cc: DDDRE(T&E)

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EC MASTER PLAN MILESTONES									
EVENT	1991 DEC	JAN	FEB	MAR	APR	MAY	JUN	1992 JUL	
<hr/>									
EW RELIANCE REPORT (SERVICES)									
JCG APPROVES EW REPORT	6								
REPORT DIST FOR COMMENTS	16								
JCG REVIEWED/APPROVED COMMENTS									
DTEG APPROVES									
MOA SIGNED				1					
<hr/>									
REPORT TO CONGRESS (DDRE(T&E)/TR)									
EW RELIANCE REPORT EDITED									
SECDEF COVER MEMO PREPARED									
JCG-APPROVED MOA ADDED TO PACKAGE									
SECDEF COORD PACKAGE TO DTEG									
PACKAGE TO SECDEF									
<hr/>									
EC MASTER PLAN ACTIONS (DDRE(T&E)-1)									
DDRE(T&E) TASKS CONSOLIDATION ALTS									
CONTRACTOR(S) BEGIN PARALLEL STUDY									
JCG MEETS, PROVIDES GUIDANCE TO LEAD									
JCG STATUS REPORT TO DTEG									
ISSUE OUTLINES DUE									
JCG REPORTS ALTS TO SERVICES									
JCG/CONTRACTOR STUDIES REPORTS TO DTEG									
ISSUE PAPER WRITTEN INCLUDING ALL VIEWS (T)									
ISSUE PAPER FINAL (T)									
DTEG MEETS									
PDAM ISSUED									

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AUDIT TEAM MEMBERS

Donald E. Reed , Director, Acquisition Management Director
Raymond A. Spencer, Program Director
Steve Hughes, Project Manager
Earl Van Field, Team Leader
Jonathan Rabben, Team Leader
Sterling Malcolm, Auditor
Robert King, Auditor
Jacqueline Wicecarver, Auditor
Cindi Wotta, Auditor

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400 Army Navy Drive (Room 801)
Arlington, VA 22202-2884

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